UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2002/01476

July 10, 2003

Mr. Lawrence C. Evans
Portland District
Corps of Engineers
CENWP-OP-GP (Ms. Kathryn Harris)
P.O. Box 2946
Portland, OR 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat Consultation on the Construction of the Lincoln City Municipal Water Intake on Schooner Creek, Siletz River Basin, Lincoln County, Oregon (Corps No. 200100298)

Dear Mr. Evans:

Enclosed is a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the construction of the Lincoln City municipal water intake structure on Schooner Creek, Siletz River basin, Lincoln County, Oregon. NOAA Fisheries concludes in this Opinion that the proposed action is not likely to jeopardize Oregon Coast coho salmon (*Oncorhynchus kisutch*).

This document also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and its implementing regulations (50 CFR 600).

Please direct any questions regarding this letter to Robert Anderson of my staff in the Oregon Habitat Branch at 503.231.2226.

Sincerely,

for D. Robert Lohn
Regional Administrator

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Construction of the Lincoln City Municipal Water Intake Structure on Schooner Creek,
Siletz River Basin,
Lincoln County, Oregon

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: NOAA's National Marine Fisheries Service, Northwest Region

Date Issued: July 10, 2003

Issued by:

for D. Robert Lohn
Regional Administrator

Refer to: **2002/01476**

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1. INTRODUCTION

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), as amended, establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with U.S. Fish and Wildlife Service and NOAA's National Marine Fisheries Service (NOAA Fisheries), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitats. This biological opinion (Opinion) is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations found at 50 CFR 402.

The analysis also fulfills the essential fish habitat (EFH) requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2)).

The proposed action is issuance of a permit by the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act to authorize discharge of fill materials into waters of the United States by the City of Lincoln City (City) to construct a municipal water intake structure at river-mile 2.9 in Schooner Creek, a tributary to Siletz Bay. The administrative record for this consultation is on file at the Oregon Habitat Branch office of NOAA Fisheries.

1.1 Background and Consultation History

On January 24, 2001, NOAA Fisheries met with the City and its consultant CH2M Hill, the Corps, and the Oregon Department of Fish and Wildlife (ODFW) to discuss the proposed construction of a municipal water intake structure in Schooner Creek, a tributary to Siletz Bay, in Lincoln County, Oregon. On February 8, 2001, NOAA Fisheries met with the City and the Corps to evaluate conceptual weir-intake designs for the subject action. NOAA Fisheries notified the City that the proposed design concept did not meet NOAA Fisheries' fish passage and screening criteria, and recommended an alternative design.

On April 5, 2001, NOAA Fisheries received a draft biological assessment (BA) from CH2M Hill for review. NOAA Fisheries requested additional information on design specifications (*e.g.*, fish passage and screening). On June 6, 2001, CH2M Hill submitted an addendum to the draft BA to NOAA Fisheries for review. The cover letter stated that design specifications were preliminary and additional changes were likely.

On June 18, 2001, the Corps issued a public notice for the subject action. On July 9, 2001, the Corps submitted a BA to NOAA Fisheries and initiated formal consultation. In July 2001, NOAA Fisheries notified the Corps that the BA submitted on July 9, 2001 was insufficient to initiate consultation, and the consultation would not proceed until the proposed design was in compliance with NOAA Fisheries' fish passage and screening criteria. NOAA Fisheries also notified the Corps that the request for formal consultation was initiated before the closing date of the public notice.

On September 12, 2001, U. S. District Court (Oregon) Judge Michael Hogan issued an order setting aside the listing of Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*) as threatened under the ESA. On December 14, 2001, the U.S. Court of Appeals (9^{th} circuit) stayed Judge Hogan's order pending resolution of an appeal, thus reinstating OC coho salmon as a threatened species.

On February 6, 2002, NOAA Fisheries meet with the ODFW, the City, and CH2M Hill to discuss on-going issues with the proposed design, diversion operations, and effects to ESA-listed species. On March 5, 2002, NOAA Fisheries received a draft intake operations plan and hydraulic analysis for review.

On March 12, 2002, NOAA Fisheries met with CH2M Hill to discuss on-going issues regarding the proposed design, operations plan, hydraulic analysis, and effects to ESA-listed species. In the meeting, NOAA Fisheries notified CH2M Hill that there were outstanding issues with the proposed intake-weir design and diversion operations (*e.g.,* fish passage and screening criteria, and low flow operations) that need to be resolved before the consultation could proceed.

On March 13, 2002, NOAA Fisheries provided CH2M Hill with a letter requesting specific information required to assess the new information on the draft intake operations plan and the hydraulic analysis. On March 26, 2002, NOAA Fisheries provided CH2M Hill with a letter of clarification regarding the operations plan (*e.g.*, withdrawal rates instream flows, channel depths, and temperature profiles).

On April 30, 2002, NOAA Fisheries and the Corps received a draft BA from CH2M Hill for review. The proposed action had been modified to included two new grade control features. The draft BA did not contain the requested information in the letters dated March 13, 2002 and March 26, 2002, or information regarding fish passage and screening.

On June 3, 2002, the Corps issued a new public notice for the project. On June 19, 2002, NOAA Fisheries met with the Corps, the City and its legal counsel, and CH2M Hill to discuss the status of the project and the consultation. At the meeting, the Corps indicated that they were withdrawing the July 9, 2001 request for formal consultation. On June 20, 2002, NOAA

Fisheries received a letter dated June 18, 2002, from the Corps withdrawing the July 9, 2001 request for formal consultation.

On June 21, 2002, NOAA Fisheries provided the Corps written comments regarding weir-intake operations during low precipitation years, and potential effects to ESA-listed species in response to the June 3, 2002, public notice.

On September 11, 2002, NOAA Fisheries met with the Corps, the City and its legal counsel, and CH2M Hill, to discuss outstanding issues and the status of the consultation for the subject action. During the meeting NOAA Fisheries reiterated that since the weir-intake would be designed to permit upstream and downstream fish passage at a minimum of 3 cubic feet per second (cfs) instream flows, that 3 cfs would be the minimum instream flow that would provide unrestricted upstream and downstream fish passage under all operations. NOAA Fisheries stated that any flow proposal to divert water that leaves less than 3 cfs for instream flows would create an upstream and downstream fish passage barrier, and likely would reduce or eliminate fish use downstream of the weir-intake during these flows.

On December 27, 2002, NOAA Fisheries received a letter from the Corps requesting consultation pursuant to section 7(a)(2) of the ESA and EFH consultation pursuant to section 305(b)(2) of the MSA for the issuance of a permit under section 404 of the Clean Water Act to the City to authorize discharge of fill material into waters of the United States for construction of the new water intake structure. Submitted with the letter was a BA describing the proposed action and potential effects that may result from project implementation. In the BA, the Corps determined that the proposed action was likely to adversely affect OC coho salmon, an ESA-listed species, and requested formal consultation. OC coho salmon were listed as threatened under the ESA on August 10, 1998 (63 FR 42587), and protective regulations were issued on July 10, 2000 (65 FR 42422).

On April 28, 2003, NOAA Fisheries and the City's legal counsel held a phone conference to discuss outstanding issues, particularly the proposed low flow operations. The City's attorney said that the City would provide design flows of at least 3 cfs for fish passage. NOAA Fisheries agreed to this modification of the proposed action.

On June 2, 2003, NOAA Fisheries met with the Corps, the City and its legal counsel, and CH2M Hill to discuss details related to habitat restoration, monitoring during average and low flows, and information needs for development of a low-flow operations plan.

1.2 Proposed Action

The proposed action is issuance of a permit by the Corps under section 404 of the Clean Water Act to authorize discharge of fill materials into waters of the United States by the City to construct a municipal water intake structure at river mile (rm) 2.9 in Schooner Creek, a tributary to Siletz Bay. Approximately 1623 cubic yards (CY) of fill material (weir-intake structure, riprap, boulders, gravels, and concrete) is proposed. The total area of affected streambed would be approximately 2430 square feet (ft^2). Of this 2430 ft^2, approximately 1070 ft^2 of streambed would be permanently modified to accommodate the weir-intake structure. Approximately 7500 ft^2 of streambank would be modified and armored with rock. Elements of the proposed action (weir-intake, streambank modification, streambed modification, work area isolation, maintenance operations, habitat enhancement, and conservation measures) are described below.

1.2.1 Weir-Intake

An existing water intake structure and a 24-foot portion of an existing diversion pipeline would be removed. Approximately 33 feet of new pipe would be placed within the streambed. The new pipe would tie into the existing pipeline, which would carry water via gravity from the intake to the pump station wet-well caisson.

The new weir-intake would consist of two sets of two concrete weirs across the stream channel, with one set of weirs on each side of the structure, at the upstream and downstream ends of a 27-foot long intake bay. The intake screen would be near the center of the channel, would vary in width from 3 to 8 feet, and would be approximately 27 feet long. The intake screens would have 0.0689-inch openings, with a length of 12 feet, and a gross area of 27.84 ft^2 for each screen. Obermeyer gates at the upstream and downstream ends of the screening bay would control pool elevations and flow through the bay. The downstream weir would range in height from 32.0 feet elevation mean sea level (MSL) near the middle of the weir to 35.1 feet MSL near the bank, with an elevation of 33.8 MSL feet near the intake bay. The upstream weir would vary in height from 32.8 feet elevation MSL near the middle of the weir to 34.3 feet MSL near the bank, with an elevation of 34.6 feet MSL near the intake bay. The weir walls would be keyed into the streambanks, and a trench would be excavated into the streambed to install the weir footings to a depth approximately 3 feet below streambed elevation. The downstream pool would be set at an elevation of 32.0 feet MSL with a drop of 1.6 feet across the weir-intake pool. The upstream pool elevation would be set at a minimum elevation of 33.6 feet MSL with a minimum depth of 1.6 feet. The intake pool would maintain a minimum depth of 3 feet.

The intake bay would be designed to allow upstream and downstream fish passage. Upstream and downstream fish passage design flows are 3 cfs. The weir walls (left bank) would each have a 10-inch-deep by 16-inch-wide notch for fish passage at low flows. The weir wall notches would be set at an elevation of 32 feet MSL at the downstream end, and 32.8 feet MSL at the upstream end. Instream flows greater than 3 cfs would flow through the low flow notches and over the weir walls to enhance fish passage.

1.2.2 Present and Future Diversions and Weir-Intake Operations

Present and future maximum daily water withdrawal rates, up through 2025, and instream flows for average precipitation years based on 22 years of stream flow data are shown in Table 1.

Table 1. Twenty-Two Year Stream Flow Averages for Average Precipitation Years (1973-1994), Present and Future Maximum Daily Water Withdrawal Rates, and Remaining Instream Flows for Fish Passage and Instream Needs After Water Withdrawals

	June	*July*	*August*	*September*	*October*	*November*
22-year Average Stream Flow (cfs)	49.7	29.3	17.1	17.5	29.1	116.8
Instream Withdrawals (cfs)						
2003	4.1	4.9	5.1	4.7	4.1	4.4
2004-2012	5.6	6.8	7.0	6.4	5.6	6.0
2013-2025	7.5	9.1	9.3	8.6	9.1	8.0
Remaining Instream Flows (cfs)						
2003	45.6	24.4	12.0	12.8	25.0	112.4
2004-2012	44.1	22.5	12.4	11.1	23.5	110.8
2013-2025	42.2	21.1	10.1	8.9	20.0	108.8

Present and future maximum daily water withdrawal rates up through 2025 for low precipitation years are shown in Table 2. Current and future infiltration gallery withdrawal rates are 2.3 cfs (maximum) of hyporheic groundwater.

Table 2. Twenty-Two-Year Stream Flow Averages for Low Precipitation Years (1973-1994), Present and Future Maximum Daily Water Withdrawal Rates, and Remaining Instream Flows for Fish Passage and Instream Needs after Water Withdrawals. Boldfaced Characters Represent Instream Flows Insufficient to Permit Upstream and Downstream Fish Passage at the Weir-intake Structure

Year	*June*	*July*	*August*	*September*	*October*	*November*
22-year Average Stream Flow (cfs)	15.2	11.4	8.7	8.7	7.9	9.3
Instream Withdrawals (cfs)						
2003	4.1	4.9	5.1	4.7	4.1	4.4
2004-2012	5.6	6.8	7.0	6.4	5.6	6.0
2013-2025	7.5	9.1	9.3	8.6	9.1	8.0
Remaining Instream Flows (cfs)						
2003	11.1	6.5	3.6	4.0	3.8	4.9
2004-2012	9.6	4.6	**1.7**	**2.3**	**2.3**	3.3
2013-2025	7.7	**2.3**	**0.0**	**0.1**	**0.0**	**1.3**

1.2.3 Infiltration Gallery

The existing infiltration gallery would remain in service. The infiltration gallery lies in the alluvial aquifer of Schooner Creek at left bank, and lies directly beneath the proposed weir-intake. The infiltration gallery has a total length of approximately 120 linear feet with four multi-port intakes spaced at 30-foot intervals perpendicular to the stream channel. The infiltration gallery withdraws a maximum of 2.3 cfs of hyporheic groundwater.

1.2.4 Streambank Modification

Three hundred seventy-five linear feet (approximately 7500 ft^2) of streambank (200 feet right bank and 175 feet left bank) would be covered with 950 CY of fill (Class 100 riprap, and would include 240 CY of sand, silt, and gravel). The streambanks would be placed at a 2:1 slope. The proposed streambank modification would replace all existing earthen materials (*i.e.*, vegetation, soil, gravels) with a solid rock revetment.

1.2.5 Streambed Modification

Total area of affected streambed equals 2430 ft^2. Of this 2430 ft^2, approximately 1070 ft^2 would be permanently altered by placement of 180 CY of fill material. Fill material placed upstream (27 feet) and downstream (100 feet) of the weir would consist of round gravels and cobbles.

1.2.6 Work Area Isolation

In-water construction activities (*e.g.*, installation and removal of cofferdams, excavation of streambed materials, installation of the weir-intake, installation and removal of water pipelines and existing intake, streambank modification) would occur in two phases. To isolate the work area from instream flows, a cofferdam would be installed across one-half of the stream at a time during construction to permit continuous instream flows and fish passage throughout construction. Once the cofferdam was installed, the internal area would be netted to remove fish, de-watered, followed by construction and cofferdam removal. This method would be repeated for the second phase of construction. All in-water work (defined as all work below top-of-bank) would occur within the in-water work window recommended by the ODFW (July 1 through September 15) (ODFW 2002).

1.2.7 Habitat Enhancement

The City proposes to place 12 to 15 trees with attached root wads downstream from the weir-intake to increase pool frequency and quality (memorandum from William Stelle to Robert Anderson, April 7, 2003).

1.2.8 Maintenance Operations

Over time, sediments likely would accumulate in the weir-intake pools and require excavation to maintain pool depths for proper weir-intake operations and fish passage. Maintenance activities would likely require in-water work, including work area isolation (*e.g.*, block nets or seine nets), fish removal and handling, and excavation of sediments.

1.2.9 Conservation Measures

NOAA Fisheries regards the conservation measures included in the consultation request as intended to minimize adverse effects to OC coho salmon and their habitats, and considers them to be part of the proposed action. Conservation measures in the following categories would apply (see consultation proposal for details): In-water and streambank work, clearing and grubbing, erosion and pollution control, hazardous materials, and habitat remediation.

1.3 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area (project area) involved in the proposed action (50 CFR 402.02). The direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing upstream and downstream fish passage, injury to or killing of OC coho salmon, loss of instream habitat, degradation of streambank functions and temporary increases in suspended sediments and turbidity. Indirect effects may occur throughout the watershed where actions described in this Opinion lead to additional activities (*e.g.*, increased water withdrawals) or affect ecological functions contributing to aquatic and riparian habitat degradation. For this consultation, the action area includes all habitats accessible to OC coho salmon in Schooner Creek from river mile 0.0 to river mile 3.25, including the channel migration zone (CMZ).

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

This Opinion considers the potential effects of the proposed action on OC coho salmon, which occur in the action area.

2.1.1 Biological Information

Life history of OC coho salmon are represented in Table 3. Spawning, incubation, rearing, and migration occur throughout accessible reaches of the watershed.

Table 3. OC Coho Salmon Life History Timing in the Schooner Creek Subwatershed (Weitkamp 1995, Steelquist 1992, ODFW 2002). Light Shading Represents Low-Level Abundance, Dark Shading Represents Peak Abundance

	J	F	M	A	M	J	J	A	S	O	N	D
River Entry												
Spawning												
Incubation-Intragravel Development												
Juvenile Freshwater Rearing												
Juvenile Migration												

Juvenile Residence in Estuary												

Estimated escapement of coho salmon in coastal Oregon was about 1.4 million fish in the early 1900s, with harvest of nearly 400,000 fish (Weitkamp *et al.* 1995). Abundance of wild OC coho salmon declined during the period from about 1965 to 1975 (Nickelson *et al.* 1992). Lichatowich (1989) concluded that production potential (based on stock recruit models) for OC coho salmon in coastal Oregon rivers was only about 800,000 fish, and associated this decline with a reduction in habitat capacity of nearly 50%. Recent estimates of wild spawner abundance in this evolutionarily significant unit (ESU) has ranged from 16,500 adults in 1990 to nearly 60,000 adults in 1996, and 35,000 adult coho in 2001 (ODFW 2002). The current status of OC coho salmon, based upon their risk of extinction, has not significantly improved since the species was listed.

Estimated spawning populations for naturally-produced coho salmon in the Siletz River basin averaged 933 adults from 1990 through 2001. These results are summarized in Table 4.

Table 4. Estimated Spawning Populations for Naturally-Produced Coho Salmon in the Siletz River Basin (Jacobs *et al.* 2001, ODFW 2002)

Year	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Estimated Siletz River Basin Population	441	984	2447	400	1200	607	763	336	394	706	2061	856

Estimated historical (1923 to 1940) run sizes in Schooner Creek were 1505 naturally-spawning coho salmon (USFS/BLM 1996). For the period from 1987 to 1999 escapement in Schooner Creek averaged 24 OC coho salmon (USFS/BLM 1996), representing a decline of more than 95% in the subpopulation. Estimated spawning populations for naturally-produced coho salmon in Schooner Creek averaged 30 adults from 1990 through 2001. These results are summarized in Table 5.

Table 5. Estimated Spawning Population for Naturally-Produced OC Coho Salmon in Schooner Creek (USFS 1996, ODFW 2002).

Year	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Estimated Schooner Creek Population	23	51	127	21	50	22	1	7	NA	24	6	27

Results of summer surveys by ODFW for juvenile OC coho salmon in Schooner Creek (1980-1985) is summarized in Table 6. Survey data collected by ODFW in Schooner Creek (1998) estimated densities of juvenile OC coho salmon in summer to be 0.03 fish $^{-2}$ (Rodgers 2000).

Table 6. Estimated Summer Juvenile OC Coho Salmon Density in Schooner Creek 1980-1985 (ODFW 2002).

Year	Fish Density	RM 0.2 to 2.4	RM 2.4 to 5.0	RM 5.0 to 6.5	Total Fish	RM 0.2 to 2.4	RM 2.4 to 5.0	RM 5.0 to 6.5
1980		0.04 fish m^{-2}	0.23 fish m^{-2}	0.57 fish m^{-2}		35	382	465
1981		0.23 fish m^{-2}	0.05 fish m^{-2}	0.18 fish m^{-2}		190	85	166
1982		0.21 fish m^{-2}	0.28 fish m^{-2}	0.47 fish m^{-2}		189	421	394
1983		0.16 fish m^{-2}	0.07 fish m^{-2}	0.11 fish m^{-2}		144	105	92
1984		0.12 fish m^{-2}	0.06 fish m^{-2}	0.16 fish m^{-2}		108	90	134
1985		0.32 fish m^{-2}	0.25 fish m^{-2}	0.50 fish m^{-2}		303	272	378

Juvenile OC coho salmon rear (year-round) and migrate in the main stem and tributaries of Schooner Creek. Juvenile OC coho salmon use Siletz Bay for smoltification and limited rearing. Juvenile OC coho salmon (0+ and 1+ age classes) likely use Siletz Bay for rearing during high discharge stages (winter) when the bay is dominated by freshwater. Some opportunistic rearing by 1+ juvenile OC coho salmon also likely occurs in low salinity regions of Siletz Bay during low discharge stages (summer). Adult OC coho salmon hold, migrate, and spawn in the main stem and tributaries of Schooner Creek. Spawning occurs upstream of the weir-intake on the main stem, north fork and south fork of Schooner Creek, and the lower 0.5 mile of Erickson Creek.

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR 402.02 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations and when appropriate combines them with the Habitat Approach (NOAA Fisheries 1999): (1) Consider the biological requirements of the listed species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species; and (4) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the effects of the environmental baseline, and any cumulative effects, and considering measures for survival and recovery specific to other life stages. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species. If so, step 5 occurs. In step 5, NOAA Fisheries may identify reasonable and prudent alternatives for the action that avoid jeopardy, if any exist.

The fourth step above requires a two-part analysis. The first part focuses on the action area and defines the proposed action's effects in terms of the species' biological requirements in that area (*i.e.*, effects on essential habitat features). The second part focuses on the species itself. It describes the action's effects on individual fish, or populations, or both, and places these effects in the context of the evolutionarily significant unit (ESU) as a whole. Ultimately, the analysis seeks to answer the question of whether the proposed action is likely to jeopardize a listed species' continued existence.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess to the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The biological requirements are population characteristics necessary for OC coho salmon to survive and recover to naturally-reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For actions that affect freshwater habitat, NOAA Fisheries usually describes the habitat portion of a species' biological requirements in terms of a concept called properly functioning condition

(PFC). PFC is defined as the sustained presence of natural,[1] habitat-forming processes in a watershed that are necessary for the long-term survival of the species through the full range of environmental variation (NOAA Fisheries 1999). PFC, then, constitutes the habitat component of a species' biological requirements. OC coho salmon survival in the wild depends upon the proper functioning of ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while at the same time removing adverse effects of current practices. For this consultation, the biological requirements are improved habitat characteristics that would function to support successful adult migration, holding, and spawning; and juvenile rearing, upstream and downstream migration, and smoltification.

Essential habitat features for juvenile rearing (growth and development) areas include adequate water quality, water quantity, water velocity, cover and shelter, dietary and spatial resources, riparian vegetation, and safe passage to upstream and downstream habitats.

Essential habitat features for juvenile migration corridors include adequate water quality, water quantity, water velocity, cover and shelter, dietary resources, riparian vegetation and space.

Essential habitat features for adult migration corridors include adequate water quality, water quantity, water velocity, cover and shelter, riparian vegetation and space.

2.1.4 Environmental Baseline

In step two of NOAA Fisheries' analysis, it evaluates the relevance of the environmental baseline in the action area. Regulations implementing section 7 of the ESA (50 CFR 402.02) define the environmental baseline as the past and present effects of all Federal, state, or private actions and other human activities in the action area. The environmental baseline also includes the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation, and the effects of state and private actions that are contemporaneous with the consultation in progress.

Schooner Creek is a perennial stream that drains an area of approximately 18 square miles. The headwaters of Schooner Creek are steep, high gradient reaches typical of rivers in the coastal mountains; the stream transitions into low gradient, response reaches in the lower ±4 miles. Typical stream flows range from 200 cfs to 18 cfs (BA). Flow extremes can range from 1,390 cfs (winter) to 7.9 cfs (summer) (BA). Current maximum daily water withdrawal rates for June through November during average and low precipitation years by percent flow vary from a minimum of 4% to 50% (Table 7).

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[1] The word "natural" in this definition is not intended to imply "pristine," nor does the best available science lead us to believe that only pristine wilderness will support salmon.

Land uses in the action area include rural-residential, commercial-industrial, agricultural, recreational, and commercial forestry. Riparian areas and stream channels in the action area have been damaged by activities related to these land uses throughout the watershed (FEMAT 1993, Botkin *et al.* 1995, OCSRI 1997). Habitat changes that have contributed to the decline of OC coho in the action area include: (1) Reduced biological, chemical, and physical connectivity between streams, riparian areas, flood plains, and uplands; (2) elevated fine sediment yields; (3) reduced in-stream large woody debris; (4) loss or degradation of riparian vegetation; (5) altered stream channel morphology; (6) altered base and peak stream flows; and (7) fish passage impediments.

Table 7. Twenty-Two Year Stream Flow Average for Average and Low Precipitation Years (1973-1994), Current Maximum Daily Water Withdrawal Rates (Diversion Pipeline and Infiltration Gallery), and Percent of Instream Flows Withdrawn

	June	July	August	September	October	November
Stream Flows (cfs), Average Precipitation Year	49.7	29.3	17.1	17.5	29.1	116.8
Stream Flows (cfs), Low Precipitation Year	15.2	11.4	8.7	8.7	7.9	9.3
Instream Withdrawals, Average and Low Water Years (cfs)						
Diversion Pipeline (cfs)	4.1	4.9	5.1	4.7	4.1	4.4
Infiltration Gallery (cfs), Hyporheic Groundwater	2.3	2.3	2.3	2.3	2.3	2.3
Percent of Instream Flows Withdrawn						
Average Water Year	8	17	30	27	14	4
Low Water Year	27	43	59	54	52	47

The availability of rearing and spawning habitat for OC coho salmon has been reduced due to the presence of two dams in the watershed. These dams are on the south fork of Schooner Creek near the confluence with the north fork of Schooner Creek, and on Erickson Creek 0.5 mile upstream of the confluence with Schooner Creek. The Corps did not provide information on type and quality of fish passage facilities at these dams, although past OC coho salmon escapement and juvenile density data suggest that the dam on the south fork of Schooner Creek permits limited fish passage. Fish distribution information from ODFW indicates that the dam on Erickson Creek does not permit fish passage.

The status of habitat indicators suggests that the Schooner Creek watershed is not functioning properly. The USFS/BLM (1996) watershed analysis rated large woody debris, pool quality, off-channel habitat, and road density indicators as *not properly functioning*. Based on the presence of two dams in the watershed (south fork Schooner Creek and Erickson Creek) and the resultant loss of spawning and rearing habitat, NOAA Fisheries rates the indicator, physical barriers, as *not properly functioning*.

Schooner Creek is one of the few remaining relatively intact watersheds within the area of the Siletz River basin. Schooner Creek was included in an area designated for Tier 1 Key Watershed status (USFS/BLM 1994). Tier 1 Key Watersheds are crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonid fishes (USFS/BLM 1994).

NOAA Fisheries concludes that not all of the biological requirements of the listed species within the action area are being met under current conditions. Based on the best available information on the status of OC coho salmon, including population status, trends, and genetics, and the environmental baseline conditions within the action area, significant improvement in habitat conditions is needed to meet the biological requirements of OC coho salmon for survival and recovery.

2.1.5 Analysis of Effects

In step three of NOAA Fisheries' jeopardy analysis, it evaluates the effects of proposed actions on listed species and seeks to answer the question of whether the species can be expected to survive with an adequate potential for recovery if those actions go forward.

2.1.5.1 Short-Term Effects (Construction, Habitat Enhancement, and Maintenance Operations)

In the short term, the proposed action is likely to temporarily displace, and may injure or kill rearing juvenile OC coho salmon during in-water construction activities, fish removal and handling, habitat enhancement, maintenance operations, and is likely to temporarily increase turbidity and total suspended solids. These effects are described in detail below.

Construction Activities
In-water construction activities (*e.g.*, streambed excavation, weir-intake construction, streambank modification) would occur within cofferdams. The effects of cofferdam installation and removal, and fish removal and handling, are discussed below.

Fish Harassment
Fish may be killed, or more likely temporarily displaced, by in-water work activities. Aspects of the proposed action most likely to injure or kill OC coho salmon are the isolation of the in-water work area, and fish removal and handling. Although in-water work area isolation is a conservation measure intended to minimize adverse effects from instream construction activities to fish present in the work isolation area, some fish may be captured, handled, and released. Capturing and handling fish causes physiological stress, though overall effects of the procedure are generally short-lived if appropriate precautions are exercised. The primary factors controlling the likelihood of stress and death from handling are differences in water temperatures (between the stream and transfer containers), dissolved oxygen concentrations, the amount of time that fish are held out of the water, and the degree of physical trauma. Stress on salmonids increases rapidly from handling if the water temperature exceeds 18°C or if dissolved oxygen concentration is below saturation.

The in-water work period recommended by the ODFW (July 1 to September 15) of a given year, and the proposed fish removal methods, which require supervision by a fishery biologist experienced with capture and removal of ESA-listed species and work area isolation, are likely to minimize the adverse effects from work area isolation and fish handling.

Habitat Enhancement
Habitat enhancement includes the placement of 15 pieces of large woody debris (LWD) in the lower reaches of Schooner Creek to compensate for the long-term adverse effects from the permanent loss of 1070 ft^2 of streambed, and solid rock revetments covering an area of 7500 ft^2 of streambank. Placement of the LWD would require temporary disturbance of instream habitat for installation of LWD into the streambanks and streambed. Habitat enhancement would likely cause short-term adverse effects similar to those described above for construction and water quality (discussed below). In the long term, the mitigation would likely promote pool habitat formation and instream habitat complexity for OC coho salmon. In-water work would occur during the in-water work period recommended by the ODFW (July 1 to September 15) of a given year. The proposed fish removal methods, which require supervision by a fishery biologist experienced with ESA-listed species and work area isolation, are likely to minimize the adverse effects associated with habitat enhancement.

Maintenance Operations
Maintenance of the intake pools would require in-water work, including work area isolation, fish removal and handling, and excavation of sediments. Maintenance operations would likely cause

short-term adverse effects similar to those for construction described above (*i.e.*, fish harassment) and water quality (discussed below). The recommended in-water work period (July 1 to September 15) of a given year, and the proposed fish removal methods, which require supervision by a fishery biologist experienced with capture and removal of ESA-listed species and work area isolation, are likely to minimize the adverse effects from maintenance operations.

Water Quality - Total Suspended Solids and Turbidity

In-water construction activities (*e.g.*, coffer dam installation and removal, habitat enhancement, and maintenance operations) are likely to temporarily increase concentrations of total suspended solids (TSS). Potential effects of exposure to increased concentrations in TSS on OC coho salmon include, but are not limited to: (1) Reduction in feeding rates and growth, (2) increased mortality, (3) physiological stress, (4) behavioral avoidance, (5) reduction in macroinvertebrate populations, and (6) temporary beneficial effects. Influences of TSS and turbidity on fish reported in the literature range from beneficial to detrimental. Potential beneficial effects include a reduction in piscivorous fish/bird predation rates, enhanced cover conditions, and improved survival conditions.

Turbidity, defined as a measurement of relative clarity due to an increase in dissolved (*e.g.*, tannic acid) or undissolved particles, at moderate levels, can reduce primary and secondary productivity, and at high levels, can interfere with feeding and injure or kill adult and juvenile fish (Spence *et al.* 1996, Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments also have the potential to reduce primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success and interstitial rearing space for juvenile salmonids (Bjornn and Reiser 1991).

Salmonid fishes move laterally and downstream to avoid turbid plumes (Sigler *et al.* 1984, Lloyd 1987, Servizi and Martens 1991). Juvenile salmonid fishes tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish must traverse these streams along migration routes (Lloyd *et al.* 1987). In addition, a potential positive effect is providing refuge and cover from predation; fish that remain in turbid waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In habitats with intense predation pressure, this provides a beneficial trade-off (*e.g.*, enhanced survival) for the cost of potential physiological effects (*e.g.*, reduced growth).

Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonid fishes have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with floods, and are adapted to such exposures. Adult and larger juvenile salmonid fishes appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, chronic exposure can cause physiological stress that can increase energy required for maintenance of the fish and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Increases in TSS can adversely affect filter-feeding macroinvertebrates and fish feeding. At concentrations of 53 to 92 ppm (24 hours) macroinvertebrate populations were reduced (Gammon 1970). Concentrations of 250 ppm (1 hour) caused a 95% reduction in feeding rates in juvenile coho salmon (Noggle 1978). Concentrations of 1200 ppm (96 hours) killed juvenile coho salmon (Noggle 1978). Concentrations of 53.5 ppm (12 hours) caused physiological stress and changes in behavior in coho salmon (Berg 1983).

In-water activities (*e.g.,* construction, habitat enhancement, maintenance operations) that occur without isolation measures are likely to increase TSS and adversely affect OC coho salmon. Activities that occur within the cofferdams and above top-of-bank are less likely to directly increase TSS. Changes in TSS may persist for a period of approximately 1 to 10 hours. In-water construction of the weir-intake, installation of LWD (multiple locations), and disturbances from maintenance operations with a short duration (*i.e.,* ≤15 minutes) are likely to increase TSS for a minimum of 250 feet downstream of the proposed weir-intake construction site. Sustained disturbances occurring over a period of several hours or longer may increase TSS for up to a mile downstream. Salmon are likely to avoid waters that are chronically turbid, and therefore adverse effects are less likely after initial exposure, however, repeated chronic pulses of TSS that persist over a period of days or weeks may lead to reach-scale displacement of rearing OC coho salmon, reducing rearing survival.

2.1.5.2 Long-Term Effects (Intake-Weir Operations)

Projected maximum daily water withdrawal rates during average and low precipitation years are represented in Table 8. Beginning in the 2004-2012 period, water withdrawals in the summer and fall of low precipitation years would not leave sufficient instream flows to provide unrestricted upstream and downstream fish passage for juvenile and adult OC coho salmon, or meet the biological requirements of OC coho salmon downstream of the water intake. Potential effects of the projected withdrawals are described in detail below.

<u>Effects of Water Withdrawals During Low Precipitation Years on Juvenile OC Coho</u>
Beginning in the 2004-2012 period, water withdrawals in the summer and fall of low precipitation years would not leave sufficient instream flows to provide unrestricted upstream and downstream fish passage for juvenile and adult OC coho salmon, or meet the biological requirements of OC coho salmon downstream of the water intake.

Juvenile salmonid rearing space is directly related to stream discharge and velocity. Discharge, which is a function of velocity, area, and depth, determines the available space for juvenile rearing. Preferred summer rearing habitat for juvenile coho salmon usually consists of deep pools (>1 m) containing logs, rootwads, or large boulders in heavily shaded streams. The survival and distribution of juvenile coho salmon have both been associated with available habitat (Bustard and Narver 1975). Positive correlations between juvenile coho salmon and pool volume have been reported by Nickelson and Reisenbichler (1977) and Nickelson *et al.* (1979). Pools of 10-80 m^3 or 50-250 m^2 in size that have sufficient riparian canopy for shading are optimum for juvenile coho production (Nickelson *et al.* 1979). As juvenile salmonid fishes age and grow, they tend to be associated with the deepest pools available to them (Dolloff 1983, Dolloff and Reeves 1990). In summer, when flows are low and most growth of juvenile coho occurs, pools are important for feeding since they constitute the most efficient foraging areas available. Deeper pools may also be helpful for mediating temperature extremes in summer.

Table 8. Twenty-Two Year Stream Flow Average (1973-1994) for Average and Low Precipitation Years, Projected Maximum Daily Water Withdrawal Rates, and Remaining Flows for Fish Passage and Instream Needs. Boldfaced Characters Represent Water Withdrawals That Exceed Minimum Instream Flow Requirements for Upstream and Downstream Fish Passage past the Proposed Weir-Intake.

	June	July	August	September	October	November
Stream Flows, Average Precipitation Years (cfs)	49.7	29.3	17.1	17.5	29.1	116.8
Projected Withdrawals (cfs)						
2004-2012	5.6	6.8	7.0	6.4	5.6	6.0
2013-2025	7.5	9.1	9.3	8.6	9.1	8.0
Remaining Flows (cfs)						
2004-2012	44.1	22.5	12.4	11.1	23.5	110.8
2013-2025	42.2	21.1	10.1	8.9	20.0	108.8
Stream Flows, Low Precipitation Years (cfs)	15.2	11.4	8.7	8.1	7.9	9.3
Projected Withdrawals (cfs)						
2004-2012	5.6	6.8	7.0	6.4	5.6	6.0
2013-2025	7.5	9.1	9.3	8.6	9.1	8.0
Remaining Flows (cfs)						
2004-2012	9.6	4.6	**1.7**	**2.3**	**2.3**	3.3
2013-2025	7.7	**2.3**	**0.0**	**0.1**	**0.0**	**1.3**

Where water is withdrawn from smaller rivers and streams, seasonal or daily flow fluctuations may affect fish, macroinvertebrates in littoral areas, aquatic macrophytes, and periphyton. To support fish populations, a stream requires water of sufficient quantity and quality, suitable velocities, and a reasonably balanced combination of riffles and pools, since many preferred food organisms are produced in riffles while pools serve as resting areas (Smith 1973, Aadland 1993). The variation in structure and dynamics of the stream physical environment are primary factors affecting production and diversity of stream biota (Smith 1973, Aadland 1993). Low streamflow translates into reduced velocity, width and depth of flow, isolation of pool and riffle habitat, increased water temperature, and a reduction of available habitat.

When seasonal low flows occur, deep pools with cool-groundwater inputs are needed to provide the necessary cover and thermal refugia for juvenile salmonid fishes. Lack of suitable summer habitat may result in poor survival, and availability of summer habitat may be an important factor limiting coho production in rearing areas (Chapman 1966, Mason 1976, Chapman and Knudsen 1980, McMahon 1983, Nickelson *et al.* 1992). Availability of high quality summer habitat is important because most growth occurs within this period, over-winter survival of salmonids has been shown to increase with larger size (Hartman *et al.* 1987, Hartman and Scrivener 1990), and size at smolting has been correlated with ocean survival of anadromous salmonid fishes (Peterman 1982, Bilton *et al.* 1982, Ward *et al.* 1989), demonstrating the dependance of juvenile survival and production on high quality rearing habitat. Water withdrawals that represent a high percentage of instream flows would reduce availability of rearing habitat during summer and fall in the lower reaches of Schooner Creek. Fish that are induced to migrate downstream when temporary operation cycles permit likely would be harmed or killed due to stranding, increased predation, or increased stress when stream flows are diminished.

Because quantitative assessments (*e.g.*, incremental flow instream methodology [Bovee 1982], habitat suitability index model [McMahon 1983]) of the effects of the altered flow regime were not conducted, minimum instream flows sufficient to meet the biological and behavioral requirements of rearing juvenile OC coho salmon remain uncertain and unquantifiable. Low flow operations that do not maintain sufficient instream flows to provide unrestricted upstream and downstream fish passage for juvenile coho salmon, and to maintain stream and riparian habitat functions, are likely to harm or kill juvenile OC coho salmon. These effects are likely to persist for over a period of months for a given year, and to appreciably reduce the functioning of already-impaired habitat.

<u>Effects of Water Withdrawals During Low Precipitation Years on Adult OC Coho</u>

Most stocks of Pacific salmon, including coho, have evolved to spawn in the fall when stream flows are increasing and water temperatures are declining (EPA 2001a). The minimum instream water depth needed to permit passage of adult salmon is 7 inches (Thompson 1972, Bjornn and Reiser 1991), however, substantially greater depths may be needed to negotiate large barriers, as are adequate stream velocities and water temperatures.

Water withdrawals during the fall that represent a high percentage of instream flows would reduce availability and suitability of holding and migration habitat in the lower reaches of Schooner Creek. Fluctuating instream flows caused by water withdrawal operations could induce adult coho salmon to enter Schooner Creek at times when passage of adult OC coho salmon to the weir might not be possible without exposure to periods of artificially interrupted flow, or to periods when flows are insufficient to pass over the weir.

Because quantitative assessments (*e.g.*, incremental flow instream methodology [Bovee 1982], habitat suitability index model [McMahon 1983]) of the effects of the altered flow regime were not conducted, minimum instream flows sufficient to meet the biological and behavioral requirements of holding and migrating adult OC coho salmon remain uncertain and unquantifiable. Water withdrawals in low precipitation years are unlikely to maintain sufficient instream flows to provide unrestricted upstream and downstream passage for adult OC coho salmon. Delays caused by an unfavorable migration environment may increase mortality of pre-spawning adults or contribute to reproductive failure. These effects are likely to persist for over a period of months for a given year, appreciably reduce the functioning of already impaired habitat.

<u>Effects of Water Withdrawals During Low Precipitation Years on Water Temperature</u>
Water temperature within a stream is a function of both external factors, such as solar radiation, air temperature, precipitation and base flows, and internal factors such as width-to-depth ratios, groundwater inputs, and hyporheic exchange (Poole and Berman 2001). The proposed instream water withdrawals could affect both sets of factors. The partial dewatering of the stream by the proposed water withdrawals could increase the Surface Area:Volume ratio of the stream, which would increase heating of surface water due to solar radiation, and could reduce interactions between the stream and off-channel sources of cold groundwater. Partial dewatering also could increase the amount of solar radiation reaching the streambed, which can store and conduct heat into the evening hours, further increasing water temperature.

Stressful conditions for anadromous salmonid fishes begin at temperatures greater than 15.6°C, with lethal effects beginning at 21°C (EPA 2001a). Based on the available data, maximum water temperatures measured at the water treatment plant (RM 2.9) were 16.8°C, 17.4°C, 17.0°C, 16.1°C, and 14.0°C, respectively, for the months June through October. Average stream flows during this period, based on the twenty-two year average, were 49.7 cfs, 29.3 cfs, 17.1 cfs, 17.5 cfs, and 29.1 cfs, respectively. Projected maximum daily water withdrawal rates in the years 2004-2012 for June through October would leave 9.6 cfs, 4.6 cfs, 1.7 cfs, 1.7 cfs, and 2.3 cfs, respectively, for instream flows. Projected maximum daily water withdrawal rates for the years 2013-2025 would leave 7.7 cfs, 2.3 cfs, 0.0 cfs, 0.1 cfs, and 0.0 cfs, respectively, for instream flows.

Elevated water temperatures can increase the rate at which energy is consumed for standard metabolism (Fry 1971), can cause depletion of energy reserves owing to increased respiratory demands, protein coagulation, and enzyme inhibition in adult salmon (Idler and Clemens 1959, Gilhousen 1980). When ripe adult female salmonids are exposed to temperatures beyond the range of 13.3°C to 15.6°C, pre-spawning adult mortality increases, and the survival of eggs to the eyed stage decreases (McCullough 1999).

Juvenile salmon exposed to constant water temperatures greater than 18°C are highly susceptible to disease, such as *Chondrococcus columnaris.* Susceptibility to disease is a function of concentration of columnaris organisms, length of exposure, and temperature (EPA 2001b) as well as age of individual (increased age, increased resistance). Contagion of *C. columanaris* has been suspected during passage of salmon through fish ladders (Pacha 1961), and increased incidence may be a result of the creation of slow-moving waters (Snieszko 1964). Coho salmon exposed to *C. columnaris* had a rapidly increasing rate of infection with increase in water temperatures above 12.2°C (Fryer and Pilcher 1974). For coho salmon, infection frequency was low at 12.2°C (3%), but was 49% at 15°C, and rapidly jumped to 100% at water temperatures greater than 20.6°C.

Based on current water temperatures, projected water withdrawal rates and concomitant reductions in flows in the lower 3 miles of Schooner Creek for 2004-2012, during the months of August, September, and possibly October, likely would attain or exceed water temperatures that represent an increased of disease, adult mortality, and reproductive failure in OC coho salmon. For the years 2013-2025, instream flows during the months August, September, and October would range from 0.0 cfs to 0.1 cfs. The biological requirements of OC coho salmon would not be met downstream of the weir under these conditions.

<u>Effects of Water Withdrawals During Low Precipitation Years on Hydrogeological Functions</u>
Morphological features of streams, including riffles, pools, eddies, and mid-stream or off-stream channels are selectively occupied by salmonid fishes depending on life stage (Smith 1973, Aadland 1993). The portion of these riverine deposits that contain alluvial groundwater that is recharged by surface flow or discharges to surface flow is termed the hyporheic zone. Hyporheic groundwater is water that enters the alluvial aquifer from the stream, travels along localized subsurface flow pathways for relatively short periods of time (perhaps from minutes to months), and reemerges into the stream channel downstream without leaving the alluvial aquifer (Poole and Berman 2001). The hyporheic zone influences surface water temperature and quality by direct water exchange and by buffering variations in surface water conditions. Benthic

invertebrates also use the hyporheic zone as habitat and refugia, commonly migrating tens or even hundreds of meters away from the stream bed into the surrounding hyporheic zone. Small fish also have been observed using hyporheic zones as refugia (Kondolf *et al*. 2001).

Diversions of hyporheic groundwater reduce the volume of the hyporheic zone, thereby the available invertebrate habitat, changing groundwater flow paths, and the groundwater-surface water exchanges of water, nutrients, organisms, and chemical constituents (Ward and Stanford 1995). Lowering of the alluvial water table can induce profound ecological and landscape changes, including loss of hyporheic habitat as adjacent banks are dewatered (Creuze des Chatelliers and Reygrobellet 1990). More widely documented has been the loss of riparian vegetation (or prevention of seedlings from establishing) as the water table drops below the root zone of riparian plants (Reilly and Johnson 1982, DeBano and Schmidt 1989). Reduced contributions to the stream from the adjacent alluvial aquifer can reduce summer base flows. A seasonal reduction in hyporheic groundwater storage exacerbated by water withdrawals, which coincides with the growing season, could inhibit or prevent growth of riparian vegetation because water may not be available to the root zone during the growing season.

Reduced instream flows from water withdrawals are likely to lead to hydrogeological effects similar to those described above. These effects are likely to occur throughout the lower 3 miles of Schooner Creek; likely to persist over a period of months for a given year; and likely to appreciably reduce the functioning of already impaired habitat.

<u>Effects of Water Withdrawals During Low Precipitation Years on Benthic Prey Resources</u>
Water diversions can disrupt benthic prey populations used by juvenile salmon. The proposed low flow operations may de-water riffles or establish a flow disturbance regime that may alter macroinvertebrate habitat, affecting the production of benthic food organisms or causing a shift in species composition. This may increase OC coho salmon intraspecific aggression, displace them from preferred summer and fall rearing habitat, and reduce production of juveniles to the smolt stage.

<u>Effects of Water Withdrawals During Average Precipitation Years</u>
Water withdrawals during average precipitation years would likely leave sufficient instream flows to permit unrestricted upstream and downstream fish passage at the weir-intake, and likely would provide sufficient instream flows to maintain downstream conditions (*e.g.*, sufficient water volume, depths and velocities, water temperature, dissolved oxygen) throughout the lower reaches of Schooner Creek to meet the biological and behavioral requirements of OC coho salmon. Remaining instream flows during average precipitation years for 2004-2025, would range from a low of 8.9 cfs in September and a high of 110.8 cfs in November of a given year.

Effects of Streambank and Streambed Modification

Significant elements of natural riparian and stream processes can be affected by streambank hardening (*e.g.*, riprap, rock revetments) (Bolton and Shellberg 2001). Bank hardening not only modifies the streambed and bank but, as its primary purpose, stops natural processes that maintain a functioning riparian stream system. Effects on riverine processes include stream channel simplification, altered hydraulic processes, constrained stream channel migration (reduced sinuosity), loss of native sediment recruitment, and elimination of shallow-water habitat.

As erosive forces affect different locations in the stream, and bank hardening occurs in response, the stream eventually may attain a continuous fixed alignment lacking habitat complexity (USACE 1977). Bank hardening may shift erosion points either upstream, due to headcutting, or downstream, due to transfer of stream energy. Bank hardening can also increase stream velocities, contributing to channel incision and streambank failure.

Although riprap can provide some habitat features used by salmonids, such as inter-rock space, there is increasing evidence that in comparison to natural banks, fish densities at rock riprap banks are reduced (Schmetterling 2001). This is true even when compared to actively eroding cut banks (Michny and Deibel 1986, Schaffter *et al.* 1983). The use of riprap either results in site characteristics that limit suitability for fish at various life stages (Beamer and *Henderson* 1998, Peters *et al.* 1998, Li *et al.* 1984, North *et al.* 2002), or perpetuates detrimental conditions that may restrict or limit fish production (Beamer and Henderson 1998, Li *et al.* 1984). Even when rock may contribute to habitat structure within an alluvial stream system, the beneficial biological response is of limited duration with greater variability (Schmetterling 2001, Beamer and Henderson 1998, Peters *et al.* 1998, Andrus *et al.* 2000). The use of riprap changes the hydraulics, substrate, and available food and cover for fish at stream sites where it is used. Riprap can disrupt flows, reduce food delivery and create difficult swimming for smaller fish (Michny and Deibel 1986, Schaffter *et al.* 1983). These effects can reduce the suitability of the habitat for salmonids, and reduces the likelihood that adverse effects from riprap can be mitigated over time.

Alteration of the streambanks and streambed under the proposed action likely would lead to habitat effects similar to those described above, and is likely to appreciably reduce the functioning of already impaired habitat, unless habitat remediation measures are implemented to offset the probable long-term adverse effects. The proposed habitat enhancement likely would offset the long-term adverse effects from streambank and streambed alteration.

2.1.5.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation."

NOAA Fisheries is not aware of any specific future non-Federal activities within the action area that would cause greater effects to listed species than presently occurs. The action area includes significant tracts of private and state lands. Land use on these non-federal lands include rural development, agricultural, and commercial forestry. Chemical fertilizers or pesticides are used on many of these lands, but no specific information is available regarding their use. Furthermore, NOAA Fisheries generally does not consider the rules governing timber harvests, agricultural practices, and rural development on non-federal lands within Oregon to be sufficiently protective of watershed, riparian, and stream habitat functions to support the survival and recovery of listed species. Therefore, these habitat functions likely are at risk due to future activities on non-Federal forest lands within the basin.

Non-Federal activities within the action area are expected to increase due to a projected 34% increase in human population by the year 2024 in Oregon (Oregon Department of Administrative Services 1999). Thus, NOAA Fisheries assumes that future private and state actions will continue within the action area, increasing as population density rises.

2.1.6 Integration and Synthesis of Effects

The fourth step in NOAA Fisheries' approach to determine jeopardy is to determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of the species' survival and recovery in the wild. For the jeopardy determination, NOAA Fisheries uses the consultation regulations, and its Habitat Approach (NOAA Fisheries 1999) to determine whether actions would further degrade the environmental baseline or hinder attainment of PFC at a spatial scale relevant to the listed ESU. That is, because the OC coho salmon ESU consists of groups of populations that inhabit geographic areas ranging in size from less than ten to several thousand square miles, the analysis must be applied at a spatial resolution wherein the actual effects of the action upon the species can be determined.

Effects of the proposed action depend on instream flow withdrawal rates and could increase dramatically under planned future withdrawal rates during low-flow years beginning in 2004. Probable effects of the proposed action based on weir construction, habitat enhancement, maintenance operations, and future withdrawal rates during low precipitation years could include: (1) Modification of stream channel morphology (*e.g.,* permanent loss of 1070 ft^2 of streambed and placement of 7500 ft^2 of rock revetment); (2) reduction of rearing and migration habitat of juvenile OC coho salmon;

(3) reduction of holding and migration habitat of adult OC coho salmon; (4) temporary increases in total suspended solids and turbidity; (5) fish harassment; (6) reduction of base flows; (7) reduction or elimination of surface water-groundwater exchange; (8) increased water temperature leading to increased risk of disease, reduced growth, possible decreased survival of pre-spawning adults, and possible reproductive failure; and (9) reduction of benthic prey resources.

Under the proposed water withdrawal regime (which allows >3 cfs to pass the proposed water intake in a low precipitation year between the months of June through November), instream flows would be sufficient to permit unrestricted upstream and downstream fish passage. Effects to stream channel morphology and fish harassment would be similar to those described above in this section. Water quality effects and effects on benthic prey resources during average precipitation years likely would be discountable. The habitat restoration measures incorporated into the proposed action would offset changes to the streambanks and streambed, improving physical habitat conditions. Overall, the proposed action is not likely to appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward proper functioning condition.

2.1.7 Conclusion

After reviewing the current status of OC coho salmon, the environmental baseline, the effects of the proposed action, and cumulative effects in the action area, NOAA Fisheries concludes that the proposed construction of a municipal water intake on Schooner Creek by the City is not likely to jeopardize the continued existence of OC coho salmon based on: (1) The proposed water withdrawal regime that allows >3 cfs to pass the proposed water intake in a low precipitation year between the months of June through November; and (2) conservation measures incorporated into the proposed action that ensure that the project's construction, operation, and maintenance are not likely to appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward proper functioning condition.

2.1.8 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitats, or to develop additional information. The following conservation recommendations are consistent with these obligations, and therefore should be carried out by the Corps:

1. The Corps should encourage the City to apply an incremental flow instream methodology (Bovee 1982) to assess habitat availability and quality under a range of instream flows including a comparison to a habitat suitability index model for coho (McMahon 1983), or comparable methodologies that include consideration of the effects of stream discharge, velocity, and water depth on factors affecting habitat suitability for coho (including water temperature, riparian vegetation, pools, cover, and substrate) for use in the development of a low flow operations plan.

2. The Corps should encourage the City to continue to implement and refine its water conservation plan through public education, use of appropriate technology, for minimizing water use and waste (*e.g.*, replacement of out-dated plumbing, drought-tolerant landscaping, curtailment of discretionary uses during water shortages), and other available means.

3. The Corps should encourage the City to develop alternative municipal water storage devices (*e.g.*, water towers) and sources (*e.g.*, well fields) for emergency and non-emergency situations that would avoid or minimize effects on habitats of marine and anadromous fishery resources.

4. The Corps should encourage the City to consider studying the feasibility of removing the two non-operational dams in the Schooner Creek sub-watershed to help restore stream and watershed functions and to improve availability of suitable spawning and rearing habitat for OC coho salmon. Federal watershed restoration funds may be available for any such project through competitive grants.

2.1.9 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of taking specified in the incidental take statement is exceeded, or is expected to be exceeded; (2) new information (*e.g.*, monitoring, modeling) reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending conclusion of the reinitiated consultation.

2.2 Incidental Take Statement

Sections 9 and rules promulgated under subsection 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. "Harm" is further defined in 50 C.F.R. 222.102 as an act that may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering. "Harass" is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is take of listed species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of OC coho salmon because recent and historical surveys indicate the listed species occurs in the action area, and because in-water work (*e.g.*, construction, cofferdam installation and removal, habitat enhancement, maintenance operations), and fish removal and handling, are likely to harm or harass the species. The extent of non-lethal take for this Opinion is limited to take resulting from activities undertaken as described in this Opinion that occur within the lower 3.25 miles of Schooner Creek. Incidental take occurring beyond this area is not authorized by this consultation. The number of fish subjected to non-lethal take from in-water work and from fish removal and handling shall not exceed 50 juvenile OC coho salmon in a given year. The number of fish subjected to lethal take from in-water work and from fish removal and handling shall not exceed five juvenile OC coho salmon in a given year. Non-lethal and lethal take is authorized only during the recommended in-water work period (July 1 through September 15).

2.2.2 Reasonable and Prudent Measures

Reasonable and prudent measures are non-discretionary measures to minimize take, that may or may not already be part of the description of the proposed action. They must be implemented as binding conditions for the exemption in section 7(a)(2) to apply. The Corps has the continuing duty to regulate the activities covered in this incidental take statement. If the Corps fails to require the applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. NOAA Fisheries believes that activities carried out in a manner consistent with these reasonable and prudent measures, except those otherwise identified, will not necessitate further site-specific consultation. Activities which do not comply with all relevant reasonable and prudent measures will require further consultation.

The following reasonable and prudent measures are necessary and appropriate to minimize take of listed fish resulting from implementation of the proposed action. The Corps shall ensure that:

1. The amount and extent of incidental take from the proposed in-water and upland construction (*e.g.*, in-water and streambank work, clearing and grubbing, erosion and pollution control, handling of hazardous materials, habitat remediation) are minimized by ensuring that the proposed conservation measures for are fully implemented.

2. Fish passage and screening facilities comport with NOAA Fisheries' anadromous salmonid passage facility guidelines and criteria.

3. The amount and extent of incidental take from in-water construction, habitat enhancement, and fish removal and handling are minimized by ensuring that the in-water work is limited to the time when effects to OC coho salmon would be minimized.

4. The techniques used for habitat enhancement comport with the best available scientific information.

5. The disturbance to streambank and riparian habitat features in minimized, or where effects are unavoidable, that the City restore these habitat features.

6. The design flows needed to ensure unrestricted upstream and downstream fish passage are maintained at all times.

7. The reasonable and prudent measures, conservation measures, in-water construction, riparian plantings, habitat enhancement, structure maintenance, and instream flows are monitored and evaluated.

2.2.3. Terms and Conditions

These measures should be incorporated into construction contracts and subcontracts to ensure that the work is carried out in the manner prescribed.

1. To implement reasonable and prudent measure #1 (conservation measures), the Corps shall ensure that conservation measures proposed as part of the project for in-water and upland construction are fully implemented.

2. To implement reasonable and prudent measure #2 (passage and screening criteria), the Corps shall ensure that the weir-intake structure meets NOAA Fisheries' draft anadromous salmonid passage facility guidelines and criteria for fish passage and screening, available at: <http://www.nwr.noaa.gov/1hydrop/hydroweb/docs/release_draft.pdf>

3. To implement reasonable and prudent measure #3 (in-water construction), the Corps shall ensure that:

   a. All work below top-of-bank is completed within the recommended in-water work period (July 1 through September 15). Any adjustments to the in-water work period must be approved in writing by NOAA Fisheries.
   b. Before and intermittently during de-watering to isolate an in-water work area, an attempt must be made to capture and release fish from the isolated area to minimize risk of harm or killing.
      i. Complete transfers using a sanctuary net that holds water during transfer to prevent the added stress of an out-of-water transfer.
      ii. A description of any capture and release effort will be included in a post project report, including the name and address of the supervisory fish biologist, methods used to isolate the work area and minimize disturbances to ESA-listed species, stream conditions before and following placement and removal of barriers, the means of fish removal, the number of fish removed by species, the condition of all fish released, and any incidence of observed injury or mortality.
      iii. Electroshocking is not authorized under this Opinion.
      iv. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360.418.4246. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

4. To implement reasonable and prudent measure #4 (habitat enhancement), the Corps shall ensure that the City submit a plan for this measure including design of wood placement, location of placement sites, methods used to place the wood, measures to minimize disturbance of streambanks and riparian vegetation, and measures to minimize generation

of sediment and turbidity, to NOAA Fisheries within 45 days after the date of this opinion. The plan shall incorporate the following elements:[2]

a. Habitat enhancement shall include a minimum of 15 pieces of large wood with attached rootwads.
b. Large wood shall be of sufficient diameter and length to promote complex instream habitat development and associated functions, and to remain in place under high flow discharge stages, without blocking fish passage during all stream flows.
c. All large wood shall be placed downstream of the proposed project. Modification of this condition will require demonstration that sufficient sites with legal access and suitable conditions for placement of the wood are not available to the City including a written analysis of specific alternatives investigated and the reasons they are not suitable.
c. The large wood shall be placed in a manner that promotes pool development (*e.g.*, keyed into the streambed and streambanks with rootwads facing into the flow to promote pool development).
d. Large woody debris shall not cabled or chained to the streambed or streambanks.
e. Habitat enhancement shall be completed within one year of the date of this Opinion.
f. Adaptive management provision to ensure replacement for losses of suitably-sized large wood at placement sites during five years of post-project monitoring (see monitoring requirement in 7.d, below).

5. To implement reasonable and prudent measure #5 (minimization of disturbance to streambank and riparian habitats), the Corps shall ensure that:

a. The alteration or disturbance of streambanks and existing riparian vegetation is minimized.
b. Riparian plantings (*e.g.*, *Salix hookeriana*, coast willow) are incorporated into the interstices of the rock revetment with a spacing of 2 feet on center.
c. No herbicides are applied in association with the proposed action.
d. Plantings are self-established (*e.g.*, without watering) for at least three years, and are monitored for a minimum of five years with a required survival rate or plant cover of 80%.

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[2] Guidance for placing large wood can be found in (a) Washington Department of Fish and Wildlife, Washington Department of Transportation, Washington Department of Ecology. 2003. Integrated Streambank Protection Guidelines. Available online at http://www.wa.gov/wdfw/hab/ahg/ispdoc.htm and (b) Oregon Department of Forestry and Oregon Department of Fish and Wildlife. 1995. A Guide to Placing Large Wood in Streams. May. Available on ODF website, 159.121.125.11/FP/RefLibrary/LargeWoodPlacementGuide5-95.doc

e. Riparian plantings consist of native woody vegetation (*e.g.*, *S. hookeriana*, coast willow; *Lonicera involucrata*, twinberry; *Pseudotsuga menziesii*, Douglas-fir).

6. To implement reasonable and prudent measure #6 (instream flows), the Corps shall ensure that:

   a. Instream flows of at least 3 cfs passing the weir-intake are provided and maintained at all times to permit unrestricted upstream and downstream passage of juvenile and adult fish at the weir-intake.
   b. Instream flow requirements (at least 3 cfs) would remain in effect, unless a written agreement to temporarily modify this requirement is reached by NOAA Fisheries with the Corps and the applicant.
      i. Any agreement on reducing minimum instream flows shall be contingent on the development and implementation of a low-flow withdrawal plan that has been approved in writing by NOAA Fisheries. The plan shall include minimum instream flows based on results of a study using an incremental flow instream methodology (Bovee 1982) to assess habitat availability and quality under a range of instream flows including a comparison to a habitat suitability index model for coho (McMahon 1983), or comparable methodologies that include consideration of the effects of stream discharge, velocity, and water depth on factors affecting habitat suitability for coho.
      ii. A draft of the study described in 6.b.i., above, shall be submitted to NOAA Fisheries for review and approval no later than 45 days before commencement of the study.
   c. A staff gauge is installed at a suitable location as close as possible to the weir-intake and upstream of the first perennial tributary downstream of the proposed weir-intake to allow measurement of instream flows past the weir-intake. The staff gauge shall be calibrated to the USGS stream gauge at river mile 4.4 or other USGS benchmark.
   d. The fish passage notches in the weir walls are constructed and maintained according to design specifications for unrestricted upstream and downstream fish passage.
   e. The fish passage notches are kept clean of debris and maintained in a manner that does not impede fish passage.

7. To implement reasonable and prudent measure #7 (monitoring), the Corps shall ensure that:

   a. Within 60 days following completion of construction activities, a report is provided to NOAA Fisheries that discusses:

i. Implementation of conservation measures proposed by the City, including the success or failure of conservation measures, actions taken to correct any problems, and confirmation that the proposed weir-intake was built as proposed.
ii. Specific methods used to minimize sediment mobilization and increases in turbidity.
iii. Extent, duration, and frequency of any turbidity plumes related to project activities.
iv. Streambank and riparian conditions before and following in-water work.
v. Measures taken to isolate the in-water work area.
vi. Fish removal and handling methods, to include the name, phone number, and affiliation of the biologist conducting fish removal and handling.
vii. Any observed injury and/or mortality of fish resulting from project implementation.

b. Following the completion of plantings associated with the streambank and adjacent riparian zone, the Corps will provide NOAA Fisheries annually with a report by December 31 of a given year describing the success of plantings required under reasonable and prudent measure #4 (near-shore and riparian habitats). The report should focus on actions taken to ensure that plantings were done correctly and were successful at meeting the objective of 80% or higher survival rate or cover after five years, as well as indicate any replantings completed during the preceding 12-month period. The report shall include photo documentation. Once 80% or greater survival or cover has been documented for five consecutive years, this reporting requirement will be satisfied.

c. Within 60 days following completion of habitat enhancement, a report summarizing results is provided to NOAA Fisheries. This report shall discuss:

i. Final design, location and methods used to place the wood, any damage to streambanks and riparian vegetation, and actions taken to correct any problems.
ii. Specific methods used to minimize generation of sediment and turbidity, and effectiveness of those measures.
iii. Extent, duration, and frequency of any turbidity plumes related to project activities.
iv. Measures taken to isolate the in-water work area.
v. Fish removal and handling methods and results, to include the name, phone number, and affiliation of the biologist conducting fish removal and handling.
vi. Any observed injury and/or mortality of fish resulting from project implementation.

vii. Stream conditions, to include instream flows (*e.g.*, discharge, velocities, and depth), stream channel profile, and streambank condition, before and following in-water work.
viii. Photo-documentation of each placement site before and after installation of large wood from at least two fixed points during high and low flows.

d. A monitoring report on success of the habitat enhancement is provided to NOAA Fisheries one year, three years, and five years after completion of habitat enhancement. This report shall include discussion of:
i. Condition of large wood pieces at each site (*e.g.*, presence or absence, in or out of channel, jams formed)
ii. Stream conditions, to include instream flows (*e.g.*, discharge, velocities, and depth), stream channel profile, and streambank condition at the upstream and downstream limits of the placement sites.
iii. Photo-documentation of each placement site from the fixed points established during project completion.
iv. Actions taken to ensure replacement for losses of suitably-sized large wood at placement sites during the monitoring period.

e. Within 60 days following completion of maintenance operations, a report is provided to NOAA Fisheries that discusses:
i. Implementation of conservation measures proposed by the City, including the success or failure of conservation measures, and actions taken to correct any problems following completion of maintenance operations.
ii. Specific methods used to minimize sediment mobilization and increases in turbidity.
iii. Extent, duration, and frequency of any turbidity plumes related to maintenance activities.
iv. If in-water work is required, measures taken to isolate the in-water work area.
v. Streambank and riparian conditions before and following any in-water work.
vi. Fish removal and handling methods, to include the name, phone number, and affiliation of the biologist conducting fish removal and handling.
vii. Any observed injury and/or mortality of fish resulting from project implementation.

f. Results of weekly monitoring of flows and water withdrawals, and of daily monitoring of water temperature, for a single average precipitation year are provided to NOAA Fisheries.
i. This monitoring shall include data collection during the months of June through October of the first average precipitation year following issuance of this Opinion. This element will be satisfied if flows during each of the

subject months is between the 20% and 80% exceedence flows for the creek as measured at the USGS staff gauge at river mile 4.4

ii. Information gathered shall include instream flows (minimum and maximum for each week) at the weir; time, duration and volume of maximum water withdrawal rates for each week; and daily water temperatures 100 feet upstream of the weir, and at a minimum of two stations between 1000 feet downstream of the weir and 500 feet above the approximate head of tide. Water temperature shall be reported as daily minimum, daily maximum, and running 7-day average of the daily maximum for each week (*i.e.* per the protocol of the Oregon Department of Environmental Quality).

iii. Monitoring results shall be compiled, summarized and transmitted to NOAA Fisheries by December 31 of the year in which the data are collected.

g. Monitoring results for a low-flow year, taken when minimum instream flows permitted to pass the weir-intake are less than or equal to 5 cfs, are provided to NOAA Fisheries. This monitoring shall include:

I. Daily measurement of instream flows (daily minimum and maximum) at the weir-intake; time, duration and volume of maximum water withdrawal rates; and daily measurements of stream discharge, velocity, and water depth taken 100 feet upstream of the weir (discharge and velocity only), and at five stations placed beginning 100 feet downstream of the weir and ending 500 feet above the approximate head of tide.

ii. Daily measurement of water temperatures 100 feet upstream of the weir, and at a minimum of two stations between 1000 feet downstream of the weir and 500 feet above the approximate head of tide. Water temperature shall be reported as daily minimum, daily maximum, and running 7-day average of the daily maximum for each week (*i.e.* per the protocol of the Oregon Department of Environmental Quality).

h. Monitoring reports are submitted to:

National Marine Fisheries Service
Oregon Habitat Branch, Habitat Conservation Division
Attn: 2002/01476
525 NE Oregon Street, Suite 500
Portland, OR 97232-2778

3. MAGNUSON-STEVENS ACT

3.1 Background

Pursuant to the MSA:

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§305(b)(4)(A)).

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects on EFH.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: Chinook (*O. tshawytscha*); coho (*O.*

kisutch); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Action

The proposed action is detailed above in section 1.2 of this document. For this consultation, the action area includes all riverine habitats accessible to OC coho salmon from river mile 0.0 (*i.e.*, mouth of the creek) to river mile 3.25, including the channel migration zone (CMZ). This area has been designated as EFH for various life stages of coastal pelagic species, ground fish species, and chinook and coho salmon (Table 9).

3.4 Effects of Proposed Action

The proposed action will adversely affect juvenile rearing and migration habitat, adult holding and migration habitat, surface and groundwater flow interactions, benthic prey resources, and water quality for chinook and coho salmon.

3.5 Conclusion

The proposed action will adversely affect the EFH for coastal pelagic species, ground fish species, and chinook and coho salmon in the action area.

3.6 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. NOAA Fisheries recommends the Corps implement the conservation recommendations and terms and conditions in the ESA consultation.

3.7 Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920G) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse effects of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.8 Supplemental Consultation

The Corps must reinitiate EFH consultation with NOAA Fisheries if either action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

Table 9. Species with Designated EFH in the Estuarine EFH Composite in the State of Oregon.

Groundfish Species	
Leopard Shark (southern OR only)	*Triakis semifasciata*
Soupfin Shark	*Galeorhinus zyopterus*
Spiny Dogfish	*Squalus acanthias*
California Skate	*Raja inornata*
Spotted Ratfish	*Hydrolagus colliei*
Lingcod	*Ophiodon elongatus*
Cabezon	*Scorpaenichthys marmoratus*
Kelp Greenling	*Hexagrammos decagrammus*
Pacific Cod	*Gadus macrocephalus*
Pacific Whiting (Hake)	*Merluccius productus*
Black Rockfish	*Sebastes maliger*
Bocaccio	*Sebastes paucispinis*
Brown Rockfish	*Sebastes auriculatus*
Copper Rockfish	*Sebastes caurinus*
Quillback Rockfish	*Sebastes maliger*
English Sole	*Pleuronectes vetulus*
Pacific Sanddab	*Citharichthys sordidus*
Rex Sole	*Glyptocephalus zachirus*
Rock Sole	*Lepidopsetta bilineata*
Starry Flounder	*Platichthys stellatus*
Coastal Pelagic Species	
Pacific Sardine	*Sardinops sagax*
Pacific (Chub) Mackerel	*Scomber japonicus*
Northern Anchovy	*Engraulis mordax*
Jack Mackerel	*Trachurus symmetricus*
California Market Squid	*Loligo opalescens*
Pacific Salmon Species	
Chinook Salmon	*Oncorhyncus tshawytcha*
Coho Salmon	*Oncorhyncus kisutch*

4. LITERATURE CITED

Section 7(a)(2) of the ESA requires biological opinions to be based on the best scientific and commercial data available. This section identifies the data used in developing this Opinion.

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